

heating the curd without aqueous immersion to an approximate temperature range of 130°F to 160°F;
adding a cheese emulsifying salt or a dairy ingredient or both prior to mechanical working;
mechanically working the curd into a fibrous mass; and
forming the cheese into a selected shape.

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The process of claim 1 wherein the curd is comminuted to a selected size.

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The process of claim 1 wherein the coagulum is heated after being cut to facilitate moisture removal from the curd.

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The process of claim 1 wherein the milk composition is fresh milk.

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The process of claim 1 wherein the milk composition is recombined milk.

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The process of claim 6 wherein the recombined milk is prepared from either protein concentrate, acid casein, rennet casein, caseinates, nonfat dry milk, whey, whey protein concentrate, whey protein isolate, cream, or condensed milk or any combination thereof.

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(Amended) The process of claim 1 wherein the salt composition includes an alkaline earth salt of simple or complex chlorides, sulfates, phosphates or citrates used in the manufacture of process cheese, cheese food, cheese spread, cheese sauce or imitation or analog cheeses.

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(Amended) The process of claim 7 wherein the alkaline earth salt contains sodium, potassium, calcium, magnesium or combination thereof.

11. The process of claim 1 wherein a non dairy ingredient is added to the curd prior to mechanical working.

12. The process of claim 11 wherein the non-dairy ingredient is a functional carbohydrate, a lipase, a protease, a mineral acid, an organic acid, a structural protein, or an antimicrobial agent or a combination thereof.

¹³ ~~14~~. (Amended) The process of claim 1 wherein the dairy ingredient is either a milk, cream, yogurt, skim solids, or cheese that is dry, condensed, fluid, unripened, fermented or pH reduced or any combination thereof.

15. The process of claim 11 wherein the nondairy ingredient if in dry form is mixed in an aqueous solution containing about five to fifty percent by weight of the dairy ingredient.

16. The process of claim 9 wherein the salt composition if in dry form is mixed in an aqueous solution containing about five to fifty percent by weight of the salt composition.

¹⁴ 17. The process of claim 14 wherein if the dairy ingredient is in dry form is mixed in an aqueous solution containing about five to fifty weight percent of the dairy ingredient.

19. The process of claim 1 wherein a non-dairy ingredient is added to the curd via a starter culture medium.

21. The process of claim 1 wherein the cheese has a final moisture content in the range of about 20 to about 90 weight percent.

22. The process of claim 21 wherein the cheese has a final moisture content in the range of about 30 to 60 weight percent.

23. The process of claim 21 wherein the cheese final moisture content is adjustable by the addition of inert ingredients.

24. The process of claim 23 wherein the inert ingredients are either structural carbohydrates or silicates or a combination thereof.

25. The process of claim 1 wherein the mechanical working of the curd is done in a waterless cooker.

26. The process of claim 1 and further including:
cooling the cheese after the cheese is formed into the selected shape.

27. The process of claim 26 and further packaging the cooled cheese.

28. The process of claim 26 wherein the cheese is formed into either a circular, oval or rectangular cross-sectional shape between 0.25 inch to 15 inches in diameter or width or both in a horizontal or vertical plane.

~~24~~ 29. (Amended) The process of claim 1 wherein the cheese is formed into shape by being extruded directly into packaging.

A-4 ~~25~~ 30. (Amended) The process of claim 1 wherein curd acidity is adjusted to a pH range of approximately 5.0 to 5.4.

31. A ~~product~~ produced by the process of claim 1 characterized by retention of mozzarella-like stringy texture even after two months from creation.

32. A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:

providing a milk composition having a selected protein and fat composition;

pasteurizing the milk composition;

forming a coagulum from the milk composition;

cutting the coagulum to separate curd and whey;

draining the whey from the curd;

heating the curd to an approximate temperature range of 130°F to 160°F;

adding phosphate or citrate emulsifying salts or a combination thereof to the curd;

mechanically working the curd into a fibrous mass; and

forming the cheese into a selected shape.

33. The process of claim 32 wherein the emulsifying salt is an alkaline earth salt.

34. The process of claim 33 wherein the alkaline earth salt is a sodium, potassium, calcium, magnesium salt.

35. The process of claim 32 wherein the salt is mixed into the curd in the form of an aqueous solution containing about 5 to 50% of the salt based on the weight of the solution.

36. The process of claim 32 wherein the cheese has a finished moisture content in the range of 40 to 60% after being formed into the selected shape.

37. The process of claim 32 wherein the temperature of the curd is in the approximate range of 20 to 160°F when adding the emulsifying salts.

38. The process of claim 35 wherein the aqueous solution is mixed into the curd for a period of time ranging from approximately 2 to 60 minutes prior to heating the curd.

39. The process of claim 32 wherein the cheese is formed into the selected shape by being extruded into packaging.

40. The process of claim 32 wherein forming the cheese into the selected shape includes forming the cheese into an intermediate shaped extrudate by extrusion onto a chill roll or continuous belt.

41. The process of claim 32 wherein the cheese produced by the process of claim 30 is characterized by a shelf life of up to six months.

42. A product produced by the process of claim 32 characterized by retention of mozzarella-like stringy texture even after two months from creation.

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comprising:

A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:
providing a milk composition having a selected protein and fat composition;
pasteurizing the milk composition;
forming a coagulum from the milk composition;
cutting the coagulum to separate curd and whey;
draining the whey from the curd;

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adding generally recognized as safe ingredients into the curd in amounts effective to obtain selected compositional or functional properties in a final cheese product, the generally recognized as safe ingredients including cheese emulsifying salt, a non-dairy ingredient, or dairy ingredient, or any combination thereof;

heating the curd to a range of approximately 130 to 160°F;

mechanically working the cheese curd into a fibrous mass; and

forming the cheese into a selected shape.

44. The process of claim 43 wherein heating the curd to approximately 130 to 160°F and mechanically working the cheese into a fibrous mass are separate and distinct steps.

45. The process of claim 43 wherein the cheese is formed into a selected shape by cooling.

46. The process of claim 43 wherein the cheese is packaged hot and then cooled.

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A6 The process of claim 43 wherein the cheese emulsifying salt comprises simple or complex chlorides or both, sulfates, phosphates or citrate cheese emulsifying salts or any combination thereof.

48. The process of claim 47 wherein the emulsifying salt is an alkaline earth salt.

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A7 The process of claim 48 wherein the alkaline earth salt contains sodium, potassium, calcium, magnesium or combination thereof.

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~~50~~ (Amended)

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The process of claim ~~43~~ wherein the non-dairy ingredient comprises either functional carbohydrates, lipase, protease, mineral acid, organic acid, structural protein, or anti-microbial agents, or any combination thereof.

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~~51~~ (Amended)

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The process of claim ~~43~~ wherein the dairy ingredients comprise either a milk, cream, yogurt, skim solids, or cheese that is dried, condensed, fluid, unripened, fermented or pH reduced or any combination thereof.

52. The process of claim 50 wherein the non-dairy ingredients are in dry form and are mixed in an aqueous solution containing about 5 to 50 weight percent of the non-dairy ingredient.

53. The process of claim 51 wherein the dairy ingredient are in a dry form and are mixed in an aqueous solution containing about 5 to 50 weight percent of the dairy ingredient.

54. The process of claim 47 wherein the salt composition is in a dry form and is mixed in an aqueous solution containing about 5 to 50 weight percent of the salt composition.

55. The process of claim 43 wherein the cheese has a finished moisture content in the range of about 40 to 60 weight percent.

56. The process of claim 43 wherein the cheese is formed into either a circular, oval or rectangular cross-sectional shape between 0.25 inch to 15 inch diameter or with or both in a horizontal or vertical plain.

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~~57~~ (Amended)

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The process of claim ~~43~~ wherein the cheese is formed into shape by being extruded directly into packaging.

58. The process of claim 43 wherein the cheese is characterized by a shelf life of up to six months.

59. A product produced by the process of claim 43 characterized by retention of mozzarella-like stringy texture even after two months from creation.

60. A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:

providing a milk composition having a selected protein and fat composition;
adding an acidifying agent to the milk composition;
pasteurizing the milk composition after acidification;
cutting the coagulum to separate curd and whey;
draining the whey from the curd;
heating the curd to an approximate temperature range of 130°F to 160°F;
adding phosphate or citrate emulsifying salt or a combination therefore to the curd;
mechanically working the curd into a fibrous mass; and
forming the cheese into a selected shape.

61. The process of claim 60 wherein the emulsifying salt is an alkaline earth salt.

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A9 62. (Amended) The process of claim 53 wherein the alkaline earth salt contains sodium, potassium, calcium, magnesium or combination thereof.

63. The process of claim 60 wherein the salt is mixed into the curd in the form of aqueous solution containing about 5 to 50% of the salt, based on the weight of the solution.

64. The process of claim 60 wherein the cheese has a moisture content in the range of 40 to 60% after being formed into the selected shape.

65. The process of claim 60 wherein the temperature of the curd is in the approximate range of 20 to 160°F when adding the emulsifying salts.

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A10 ~~66~~ (Amended) The process of claim ⁵⁶~~64~~ wherein the aqueous solution is mixed into the curd for a period of time ranging from 2 to 60 minutes prior to heating the curd.

67. The process of claim 60 wherein the cheese is formed into the selected shape by being extruded into packaging.

68. The process of claim 60 wherein forming the cheese into the selected shape includes forming the cheese into an intermediate shaped extrudate by extrusion onto a chill roll or continuous belt.

69. The process of claim 60 wherein the cheese produced by the process of claim 30 is characterized by a shelf life of up to six months.

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A11 ~~70~~ (Amended) An improved process of manufacturing a pasta filata cheese or a mozzarella-like cheese, the improvement comprising:

after a coagulum is formed from a milk composition, and the coagulum cut to separate the curd and whey and the whey drained from the curd, heating the curd in an aqueous free environment to an approximate temperature range of 130°F to 160°F and adding either a cheese emulsifying salt, a non-dairy ingredient or a dairy ingredient or any combination thereof and mechanically

Al1 working the curd in the aqueous free environment until a mozzarella-type texture is achieved.

71. The process of claim 70 wherein the curd is comminuted to a selected size prior to heating.

72. The process of claim 70 wherein the coagulum is heated after being cut to facilitate further moisture removal from the curd.

73. The process of claim 72 wherein the pH of the drained curd is adjusted to a range of 5.2 to 5.4.

66 ~~76~~ (Amended) The process of claim ^{*62*}~~70~~ wherein the emulsifying salt includes simple or complex chlorides, phosphates or citrates or a combination thereof.

62 ~~77~~ (Amended) The process of claim ^{*62*}~~70~~ wherein the non-dairy ingredient includes a functional carbohydrate, a lipase, a protease, a mineral acid, an organic acid, a structural protein or an antimicrobial agent or a combination thereof.

Al2 *68* ~~78~~ (Amended) The process of claim ^{*62*}~~70~~ wherein the dairy ingredient is either a milk, cream, yogurt, skim solids, or cheese that is dry, condensed, fluid, unripened, fermented or pH reduced or any combination thereof.

69 ~~79~~ (Amended) The process of claim ^{*62*}~~70~~ wherein the emulsifying salt, the dairy ingredient or the non-dairy ingredient if in dry form is mixed in an aqueous solution containing about 5 to 50% by weight of the emulsifying salt, the dairy ingredient or the non-dairy ingredient.

A12 80. (Amended) A product produced by the process of claim 70 characterized by retention of mozzarella-like stringy texture even after two months from creation.

70 81. (New) A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:

providing a milk composition having a selected protein and fat composition;

pasteurizing the milk composition;

forming a coagulum from the milk composition;

cutting the coagulum to separate curd and whey;

draining the whey from the curd;

heating the curd without aqueous immersion to an approximate temperature range of

130°F to 160°F;

adding a cheese emulsifying salt composition, a non-dairy ingredient, a dairy

ingredient or any combination thereof via a starter culture medium;

A13 mechanically working the curd into a fibrous mass; and

forming the cheese into a selected shape.

71 82. (New) The process of claim 70 wherein the curd is comminuted to a selected size.

72 83. (New) The process of claim 70 wherein the coagulum is heated after being cut to facilitate moisture removal from the curd.

73 84. (New) The process of claim 70 wherein the milk composition is fresh milk.

74 85. (New) The process of claim 70 wherein the milk composition is recombined milk.

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~~86~~ (New) The process of claim ~~85~~⁷⁴ wherein the recombined milk is prepared from either protein concentrate, acid casein, rennet casein, caseinates, nonfat dry milk, whey, whey protein concentrate, whey protein isolate, cream, or condensed milk or any combination thereof.

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~~87~~ (New) The process of claim ~~81~~⁷⁰ wherein the emulsifying salt composition includes an alkaline earth salt of simple or complex chlorides, sulfates, phosphates or citrates used in the manufacture of process cheese, cheese food, cheese spread, cheese sauce or imitation or analog cheeses.

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~~88~~ (New) The process of claim ~~87~~⁷⁶ wherein the alkaline earth salt is a sodium, potassium, calcium, magnesium or salt.

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~~89~~ (New) The process of claim ~~81~~⁷⁰ wherein the non-dairy ingredient is a functional carbohydrate, a lipase, a protease, a mineral acid, an organic acid, a structural protein, or an antimicrobial agent or a combination thereof.

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~~90~~ (New) The process of claim ~~81~~⁷⁰ wherein the dairy ingredient is either a milk, cream, yogurt, skim solids, or cheese that is dry, condensed, fluid, unripened, fermented or pH reduced or any combination thereof.

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~~91~~ (New) The process of claim ~~81~~⁷⁰ wherein the cheese has a final moisture content in the range of about 20 to about 90 weight percent.

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~~92~~ (New) The process of claim ~~81~~⁸⁰ wherein the cheese has a final moisture content in the range of about 30 to 60 weight percent.

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~~93~~ (New) The process of claim ~~91~~⁸⁰ wherein the cheese final moisture content is adjustable by the addition of inert ingredients.

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~~94~~ (New) The process of claim ~~93~~⁸² wherein the inert ingredients are either structural carbohydrates or silicates or a combination thereof.

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~~95~~ (New) The process of claim ~~94~~⁷⁰ wherein the mechanical working of the curd is done in a waterless cooker.

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~~96~~ (New) The process of claim ~~95~~⁷⁰ and further including:
cooling the cheese after the cheese is formed into the selected shape.

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~~97~~ (New) The process of claim ~~96~~⁸⁵ and further packaging the cooled cheese.

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~~98~~ (New) The process of claim ~~97~~⁸⁵ wherein the cheese is formed into either a circular, oval or rectangular cross-sectional shape between 0.25 inch to 15 inches in diameter or width or both in a horizontal or vertical plane.

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~~99~~ (New) The process of claim ~~98~~⁸⁵ wherein the cheese is formed into shape by being extruded directly into packaging.

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100. (New) A product produced by the process of claim 81 characterized by retention of mozzarella-like stringy texture even after two months from creation.

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~~101~~ (New) A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:

providing a milk composition having a selected protein and fat composition;

pasteurizing the milk composition;
forming a coagulum from the milk composition;
cutting the coagulum to separate curd and whey;
draining the whey from the curd;
heating the curd without aqueous immersion to an approximate temperature range of
130°F to 160°F;
adjusting pH of the curd to a range of approximately 5.0 to 5.4 after the whey is
drained;
mechanically working the curd into a fibrous mass; and
forming the cheese into a selected shape.

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102 (New) The process of claim 89 wherein the curd is comminuted to a selected size.

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103 (New) The process of claim 89 wherein the coagulum is heated after being cut to facilitate moisture removal from the curd.

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104 (New) The process of claim 89 wherein the milk composition is fresh milk.

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105 (New) The process of claim 89 wherein the milk composition is recombined milk.

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106 (New) The process of claim 93 wherein the recombined milk is prepared from either protein concentrate, acid casein, rennet casein, caseinates, nonfat dry milk, whey, whey protein concentrate, whey protein isolate, cream, or condensed milk or any combination thereof.

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107 (New) The process of claim 89 wherein the cheese has a final moisture content in the range of about 20 to about 90 weight percent.

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~~108~~ (New) The process of claim ~~107~~⁹⁵ wherein the cheese has a final moisture content in the range of about 30 to 60 weight percent.

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~~109~~ (New) The process of claim ~~107~~⁹⁵ wherein the cheese final moisture content is adjustable by the addition of inert ingredients.

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~~110~~ (New) The process of claim ~~109~~⁹⁷ wherein the inert ingredients are either structural carbohydrates or silicates or a combination thereof.

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~~111~~ (New) The process of claim ~~110~~⁸⁹ wherein the mechanical working of the curd is done in a waterless cooker.

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~~112~~ (New) The process of claim ~~111~~⁸⁹ and further including:
cooling the cheese after the cheese is formed into the selected shape.

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~~113~~ (New) The process of claim ~~112~~¹⁰⁰ and further packaging the cooled cheese.

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~~114~~ (New) The process of claim ~~113~~¹⁰⁰ wherein the cheese is formed into either a circular, oval or rectangular cross-sectional shape between 0.25 inch to 15 inches in diameter or width or both in a horizontal or vertical plane.

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~~115~~ (New) The process of claim ~~114~~¹⁰⁰ wherein the cheese is formed into shape by being extruded directly into packaging.

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116. (New) A product produced by the process of claim 101 characterized by retention of mozzarella-like stringy texture even after two months from creation.

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~~117~~ (New) A process of manufacturing a pasta filata cheese or a mozzarella-like cheese comprising:

providing a milk composition having a selected protein and fat composition;
pasteurizing the milk composition after acidification;
adding an acidifying agent to the milk composition after pasteurization;
cutting the coagulum to separate curd and whey;
draining the whey from the curd;
heating the curd to an approximate temperature range of 130°F to 160°F;
adding phosphate or citrate emulsifying salt or a combination therefore to the curd;
mechanically working the curd into a fibrous mass; and
forming the cheese into a selected shape.

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~~118~~ (New) The process of claim ¹⁰⁴~~117~~ wherein the emulsifying salt is an alkaline earth salt.

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~~119~~ (New) The process of claim ¹⁰⁵~~118~~ wherein the alkaline earth salt is a sodium, potassium, calcium, magnesium or salt.

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~~120~~ (New) The process of claim ¹⁰⁴~~117~~ wherein the salt is mixed into the curd in the form of aqueous solution containing about 5 to 50% of the salt, based on the weight of the solution.

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~~121~~ (New) The process of claim ¹⁰⁴~~117~~ wherein the cheese has a moisture content in the range of 40 to 60% after being formed into the selected shape.

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~~122~~ (New) The process of claim ¹⁰⁴~~117~~ wherein the temperature of the curd is in the approximate range of 20 to 160°F when adding the emulsifying salts.